



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/576,829

03/05/2007

Pascal Tromeur

Serie 6144

9073

40582

7590

02/02/2010

AIR LIQUIDE

Intellectual Property

2700 POST OAK BOULEVARD, SUITE 1800

HOUSTON, TX 77056

EXAMINER

GREENE, JASON M

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

02/02/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/576,829	<b>Applicant(s)</b> TROMEUR ET AL.	
	<b>Examiner</b> Jason M. Greene	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 11-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 April 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/5/07</u> . | 6) <input type="checkbox"/> Other: ____.  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.84(u)(1) because the view numbers are not preceded by the abbreviation "FIG.". Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claims***

2. Applicants are reminded that while reference characters are permitted in the claims, the claim language must be able to stand independent of the reference numbers. The reference numbers may not be relied upon to provide nexus between the process limitations and the apparatus parts.

It is especially noted that "U" is used as part of the claim language in claim 11 (line 12) and used as a reference character (in parenthesis) in claims 17 and 18.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 11 and 18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 11 recites the limitation "the gaseous-based hydrogen effluents" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.

Claim 18 recites the limitation "the recycle gas from the PSA" in line 14. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 11-16, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al. (US 6,179,996 B1).

With regard to claims 11, 15 and 16, Baker et al. discloses a process for recovering hydrogen-based gaseous effluents resulting from at least two (multiple, see col. 11, lines 11-43) reactor units R1 and R2 (101) in which hydrogen is consumed, the unit R2 producing a hydrogen-rich gaseous effluent at a pressure P and the unit R1 producing a hydrogen-poor gaseous effluent, wherein the gaseous effluents resulting from the reactors R1 and R2 are treated in a gas separation unit U (108) so as to provide, at a first outlet, a hydrogen-rich gaseous effluent (110) exhibiting a greater hydrogen concentration than that of the hydrogen-rich gaseous effluent, and, at a second outlet, a waste stream (109), and the enriched stream (110) resulting from the first outlet is reinjected into the reactor units (101) in which hydrogen is consumed in

Art Unit: 1797

Fig. 1, col. 2, line 3 to col. 3, line 20 and col. 11, line 11 to col. 17, line 33. It is noted that since Baker et al. teaches the reactors being used to perform different reactions, the hydrogen concentrations will vary across the reactors such that one effluent is inherently higher in hydrogen concentration than another.

Baker et al. does not teach mixing the hydrogen-poor effluents or increasing their pressure to that of the hydrogen rich-effluent, but one of ordinary skill in the art would have recognized that the effluents could be combined as a matter of design choice, such as to reduce the amount of piping required. Also, equalizing the pressure of all effluents would have been obvious to simplify operations by having all feeds at the same pressure.

With regard to claims 12 and 13, Baker et al. teaches the effluents having pressures as high as 500 or 5000 psig in col. 11, lines 33-43.

With regard to claim 14, the hydrogen concentration of the effluents could be selected as a matter of design choice, such as using excess hydrogen to improve reaction kinetics.

With regard to claims 19 and 20, Baker et al. teaches the reactors being used to perform any hydrogenation reaction, including multiple specific examples at col. 7, line 50 to col. 9, line 67. The selection of specific well-known hydrogenation reactions would be within the scope of one having ordinary skill in the art.

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al. (US 6,179,996 B1) in view of Gosling et al. (US 5,278,344).

Baker et al. does not teach the gas separation unit being an adsorber, but Gosling teaches using a PSA system (24) to recover and recycle hydrogen in a similar system (hydrodealkylation of toluene to benzene) in Fig. 1 and col. 8, line 3 to col. 9, line 8.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the PSA unit of Gosling for the membrane unit of Baker et al. since they are alternate means in the art for recovering and recycling hydrogen to reactor units.

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baker et al. (US 6,179,996 B1) and Gosling et al. (US 5,278,344) as applied against claim 17, and further in view of Krishnamurthy et al. (US 5,100,447).

Gosling et al. teaches the recited PSA process, except for the waste or purge stream being a recycle gas that is recycled to the PSA unit. However, Krishnamurthy et al. teaches recycling a waste stream (10) back to the PSA unit (B) in Fig. 1 and col. 8, lines 46-52.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the recycle of Krishnamurthy et al. into the process of Baker et al. and Gosling et al. to increase the recovery of hydrogen.

***Conclusion***

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Kahn, Sircar et al., Lehman et al., Pines et al., Pedersen et al., Baker et al. '628 and Cieutat et al. (disclose similar systems.

***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Greene whose telephone number is (571) 272-1157. The examiner can normally be reached on Monday - Friday (10:00 AM to 6:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Marcheschi can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 1797

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason M. Greene/  
Primary Examiner, Art Unit 1797

jmg  
January 30, 2010